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09/872,827	05/31/2001	Iqbal A. Goralwalla	CA920000033/2033P	3709

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SAWYER LAW GROUP  
P.O. Box 51418  
Palo Alto, CA 94303

EXAMINER

WONG, LESLIE

ART UNIT	PAPER NUMBER
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2167

DATE MAILED: 02/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/872,827

**Applicant(s)**

GORALWALLA ET AL.

**Examiner**

Leslie Wong

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on 30 August 2004. These drawings are acceptable.

### ***Withdrawal of Objections***

2. Applicants' amendments submitted on 30 August 2004 overcome to the objections in connection with the Abstract, Title, and Drawings. Examiner hereby withdrawn the objections that were given in the Office Action dated 12 May 2004.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Josten et al. ("Josten")**(U.S. Patent 5,574,902) in view of **Ponnekanti** (U.S. Patent 6,591,269).

Regarding claim 1, **Josten** teaches a method for optimizing command execution in a database system, wherein data records are stored on a plurality of data pages therein (col. 5, line 65 – col. 6, line 6), the method comprising the steps of:

- a). **'providing an identifier to each data page'** as an ordinal number (ORD#) is assigned to a data page buffer control block (BCB) in dirty page list (DPL) (col. 7, lines 10-16 and 42-52; col. 11, lines 44-46, and Fig. 2, element 44 (i.e., ordinal #));
- b). **'selecting a data record from a data page'** as list 42 includes a series of the ordinal number from DPL that are associated with data pages in the LCB that were accessed by the transaction corresponding to TPL-1 (col.7, line 53 - col. 8, line 2; col. 5, lines 5-10; col. 7, lines 10-16; col. 8, lines 1-7; col. 8, lines 46-51);
- c). **'copying the selected data record to a second storage area'** as the data manager issues a SETWRITE request to indicate intent to update the named data page (col. 7, lines 10-16; col. 8, lines 9-18);
- d). **'verifying that the selected data record has not been modified since the time that it was copied to the second storage area based upon the identifier'**

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as a test is made to detect a consecutive update to the same data page by comparing the ORD# of the last entry of the transaction page list (TPL) with the ORD# of the new entry in the buffer control block (col. 11, lines 28-38); and

e). **'executing the command'** as committing transactions schedules write-I/Os for all TPL entries (col. 18, lines 3-7).

a). **Josten** does not explicitly teach the identifier indicating when any of the data records contained therein were last modified.

**Ponnekanti**, however, teaches the log records contain only the PAGEIDs and the timestamps of the source page and the target page and the positions of the first and the last key that were copied (col. 11, lines 47-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of the cited references because **Ponnekanti's** teaching would have allowed **Josten's** to enhance the speed in which the database server stores, retrieves, and processes particular data records as indicated by **Ponnekanti** at col. 3, lines 1-10 and col. 19, lines 40-50.

Regarding claims 2 and 10, **Josten** further teaches wherein the copying step (c) includes:

(c1) copying and storing the identifier to the second storage area (col. 4, lines 27-32 and col. 7, line 57 – col. 8, line 2).

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Regarding claims 3 and 11, **Josten** further teaches wherein the verifying step (d) includes:

(d1) determining a current identifier for the data page (col. 11, lines 28-31);

(d2) comparing the current identifier with the stored identifier (col. 11, lines 34-36); and

(d3) concluding the selected data record has not been modified when the current identifier is the same as the stored identifier (col. 11, lines 36-38).

Regarding claims 4 and 12, **Josten** further teaches wherein the verifying step (d) further includes:

(d4) determining whether the selected data record has not been modified when the current identifier is not the same as the stored identifier by (col. 11, lines 36-38):

(d4a) accessing a current version of the selected data record on the data page (col. 11, lines 28-31; col. 7, lines 46-52 and col. 7, line 60 – col. 8, line 2); and

(d4b) comparing the selected data record with the current version of the selected data record (col. 11, lines 34-38; col. 13, lines 62-67).

Regarding claims 5, 14, and 21, **Josten** does not explicitly teach wherein the identifier comprises a time stamp.

**Ponnekanti**, however, teaches wherein the identifier comprises a time stamp (col. 11, lines 47-49).

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Regarding claims 6, 13, and 20, **Josten** further teaches wherein the identifier comprises a log sequence number (LSN) (col. 15, lines 1-4 and col. 16, lines 10-12).

Regarding claims 7, 15, and 18, **Josten** further teaches wherein the second storage area is a temporary data record in a temporary table (SES as RAM or temporary table col. 5, lines 56-59 and claim 1a).

Regarding claims 8, 16, and 19, **Josten** does not explicitly teach wherein the command is a positioned UPDATE and DELETE command in a relational database system supporting scrollable cursors and optimistic concurrency.

**Ponnekanti**, however, teaches wherein the command is a positioned UPDATE and DELETE command in a relational database system supporting scrollable cursors and optimistic concurrency (col. 13, line 40 – col. 16, line 33).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of the cited references because **Ponnekanti's** teaching would have allowed **Josten's** to provide high concurrency, does minimal logging, and has good performance as indicated by **Ponnekanti** at col. 19, lines 40-50.

Regarding claim 9, **Josten** teaches a computer readable medium containing programming instructions for optimizing command execution in a database system,

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wherein data records are stored on a plurality of data pages therein, the programming instructions for:

- a). **'providing an identifier to each data page'** as an ordinal number (ORD#) is assigned to a data page buffer control block (BCB) in dirty page list (DPL) (col. 7, lines 10-16 and 42-52; col. 11, lines 44-46, and Fig. 2, element 44 (i.e., ordinal #));
- b). **'selecting a data record from a data page'** as list 42 includes a series of the ordinal number from DPL that are associated with data pages in the LCB that were accessed by the transaction corresponding to TPL-1 (col.7, line 53 - col. 8, line 2; col. 5, lines 5-10; col. 7, lines 10-16; col. 8, lines 1-7; col. 8, lines 46-51);
- c). **'copying the selected data record to a second storage area'** as the data manager issues a SETWRITE request to indicate intent to update the named data page (col. 7, lines 10-16; col. 8, lines 9-18);
- d). **'verifying that the selected data record has not been modified since the time that it was copied to the second storage area based upon the identifier'** as a test is made to detect a consecutive update to the same data page by comparing the ORD# of the last entry of the transaction page list (TPL) with the ORD# of the new entry in the buffer control block (col. 11, lines 28-38); and
- e). **'executing the command'** as committing transactions schedules write-I/Os for all TPL entries (col. 18, lines 3-7).

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a). **Josten** does not explicitly teach the identifier indicating when any of the data records contained therein were last modified.

**Ponnekanti**, however, teaches the log records contain only the PAGEIDs and the timestamps of the source page and the target page and the positions of the first and the last key that were copied (col. 11, lines 47-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of the cited references because **Ponnekanti's** teaching would have allowed **Josten's** to enhance the speed in which the database server stores, retrieves, and processes particular data records as indicated by **Ponnekanti** at col. 3, lines 1-10 and col. 19, lines 40-50.

Regarding claim 17, **Josten** teaches a relational database management system comprising:

a). **'data records stored on a plurality of data pages'** as another transaction may be updating other records on the same page and efficient searching of DPL for data pages to be externalized (Fig. 2, elements 37 and 38; col. 7, line 60 – col. 8, line 2; col. 10, lines 32-47);

b). **'means for providing an identifier on each data page'** as an ordinal number (ORD#) is assigned to a data page buffer control block (BCB) in dirty page list (DPL) (col. 7, lines 10-16 and 42-52; col. 11, lines 44-46, and Fig. 2, element 44 (i.e., ordinal #));

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c). **'means for selecting a data record from a data page'** as list 42 includes a series of the ordinal number from DPL that are associated with data pages in the LCB that were accessed by the transaction corresponding to TPL-1 (col.7, line 53 - col. 8, line 2; col. 5, lines 5-10; col. 7, lines 10-16; col. 8, lines 1-7; col. 8, lines 46-51);

d). **'means for copying and storing the selected data record and the identifier from the data page to a second storage area'** as the data manager issues a SETWRITE request to indicate intent to update the named data page (col. 7, lines 10-16; col. 8, lines 9-18);

e). **'means for determining a current identifier from the data page'** as test the ORD# entry in DPL against the ORD# entry in TPL to determine which one exceeds the other (col. 13, lines 51-65; col. 11, lines 31-46); and

f). **'means for verifying that the selected data record has not been modified since the time that it was copied to the second storage area by determining that the stored identifier is the same as the current identifier from the data page'** as a test is made to detect a consecutive update to the same data page by comparing the ORD# of the last entry of the transaction page list (TPL) with the ORD# of the new entry in the buffer control block (col. 11, lines 28-38).

b). **Josten** does not explicitly teach the identifier indicating when any of the data records contained therein were last modified.

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**Ponnekanti**, however, teaches the log records contain only the PAGEIDs and the timestamps of the source page and the target page and the positions of the first and the last key that were copied (col. 11, lines 47-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of the cited references because **Ponnekanti's** teaching would have allowed **Josten's** to enhance the speed in which the database server stores, retrieves, and processes particular data records as indicated by **Ponnekanti** at col. 3, lines 1-10 and col. 19, lines 40-50.

### ***Response to Argument***

5. Applicant's arguments filed 30 August 2004 have been fully considered but they are not persuasive.

Applicants argue that Josten and Ponnekanti fail to teach or suggest "providing an identifier to each data page" in a database system as recited in claims 1 and 9, and "means for providing an identifier on each data page" in the database system, as recited in claim 17, where the identifier indicates "when any of the data records contained therein were last modified".

In response to the preceding arguments, Examiner respectfully submits that Applicants broadly claim limitation "*providing an identifier to each data page*" reads on Josten's teaching of an *unique ordinal number (ORD#)* assigned to each data page as a change indicator whenever the page state changes from clean to dirty within a single

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DBMS instant. The ORD# is assigned to a data page buffer control block (BCL) in a dirty page list (DPL) during the setwrite processing when the data page state changes from clean to dirty (abstract and col. 7, lines 10-16). Josten identifies the data page state change. Josten does not explicitly teach specifically **when** (i.e., timestamp) the data was changed. Ponnekanti, however, teaches the log records contain the PAGEIDs and the timestamps of the source page and the target page (col. 11, lines 47-49). Utilizing the timestamp associated with the PAGEID (i.e., ORD#), one would be able to identify exactly when in time the changes on the data page occurred. This is consistent with Applicants' claimed: identifier comprises a timestamp in claims 5, 14, and 21. Thus, based on the above, the combination of Josten and Ponnekanti teach the limitations as claimed.

Applicants argue that neither reference teaches or suggests "copying the selected data record to a second storage area" as recited in claims 1, 9, and 17. Josten discloses upstaging the data page to the cache buffer pool from the database. Nothing in Josten or Ponnekanti teaches or suggests selecting the data record from the data page, and then "copying the selected data record to a second storage area", as recited in claims 1, 9, and 17.

In response to the preceding arguments, Examiner respectfully submits that "copying the selected data record to a second storage area" as the original ORD#44 stored in the data page BCB in LCB 27 remains unchanged for subsequent updates to the cached data page until the page is written to stable storage (i.e., the system copies

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the modified cached data to another storage). The dirty page list (DPL) contains modified (i.e., dirty) data pages with their respective ORD#, the system selects the ordinal number from the DPL associated with the data page to be copied to the external storage (col. 7, lines 10-16; col. 8, lines 46-51; col.7, line 58 – col. 8, lines 2). As such, Josten alone teaches the limitation as claimed.

Finally, Applicants argue that neither reference teaches or suggests “verifying that the selected data record has not been modified since the time that it was copied to the second storage area based upon the identifier,” as recited in claims 1 and 9, and “means for verifying that the selected data record has not been modified since the time that it was copied to the second storage area by determining that the stored identifier is the same as the current identifier from the data page,” as recited in claim 17.

In response to the preceding arguments, Examiner respectfully submits that Josten teaches “verifying that the selected data record has not been modified since the time that it was copied to the second storage area based upon the identifier” as efficiently tracking of data pages in a database that are modified by a transaction is provided by the transaction page list (TPL), each entry of which consists of the associated ORD#. Before adding an entry to the TPL for a transaction, a simple test is made to detect a consecutive update to the same data page by comparing the ORD# of the last entry of the TPL with the ORD# of the new entry, which is available in the buffer control block (BCB) for the data page copy in local cached buffer (LCB). Hence, Josten satisfies the limitation as claimed.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leslie Wong whose telephone number is (571) 272-4120. The examiner can normally be reached on Monday to Friday 9:30am - 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leslie Wong  
Patent Examiner  
Art Unit 2167

LW  
February 1, 2005



Primary Examiner